

Total Maximum Daily Load (TMDL) Analysis for Toxic Substances in Baltimore Harbor

Summers, Robert, M., Chang, Miao-Li and Panday, Narendra N.
Maryland Department of the Environment, Baltimore, USA

Contamination of the bottom sediments of Baltimore Harbor, MD with toxic metals and organics is a major area of concern for environmental managers in Maryland. The Maryland Department of the Environment (MDE) is required under the federal Clean Water Act Section 303(d)(1)(c) and Federal Regulation 4-CFR 130.7(c)(1) to develop Total Maximum Daily Load (TMDL) analyses for contaminants in water bodies that do not meet water quality standards. In order to develop these TMDLs, a data collection, data analysis and computer modeling framework is needed to evaluate the sources, transport, residence times, and water quality impacts of chemical contaminants in Baltimore Harbor. The computer models are then used to evaluate alternative pollution reduction measures and to develop water quality restoration plans. The presentation will describe the framework that has been developed for quantitatively estimating contaminant transport, transformation, and fate within and between different regions of Baltimore Harbor and its watershed. This includes extensive monitoring studies to quantify point and non-point sources as well as the development of watershed and receiving water quality models to simulate hydrodynamics, sediment transport, and chemical-biological processes. Results from these efforts are being used to quantify the pollutant load levels that can be accommodated by the receiving waters without compromising water quality standards. The data and models will be used to determine the allocation of loading between numerous point and nonpoint sources for the toxic TMDLs in Baltimore Harbor. Implementation of the pollutant reductions indicated by the models is being carried out through a combination of voluntary and regulatory pollution control measures in the watershed.